Ms. Banks-Harold for participating in this interview and promptly preparing the Interview Summary.

During the Interview, the undersigned sought clarification regarding the motivation to combine the cited references as combined by the Examiner in the Office Action and regarding the identity of several of the Pending Application's claim limitations in the cited references. The undersigned respectfully disagrees with the statement in the Interview Summary that an agreement with respect to the claims was made. It is respectfully submitted that the only agreement reached was that the undersigned would submit a formal response to the Office Action.

**Response to the Rejection of Claims 9 and 15**:

The Examiner has rejected Claims 9 and 15 as being unpatentable over Mano et al (JP 06-012095, the English translation, hereinafter "Mano"), in view of Chennakeshu (US Pat. No.: 5,283,811, hereinafter "Chennakeshu"), further in view of Salami et al. (IEEE Transaction on Speech and Audio Processing, vol. 6, no. 2, March 1998, pp. 116-130, hereinafter "Salami"). In particular, the Examiner states that Mano teaches a speech coding method and coder that are based on linear predictive coding, such as CELP, which generates excited signals from coded speech signals and generates decoded speech from excited signals that read on "[a] speech decoder for generating an excited signal from a coded speech signal;" a synthesis filter and a post-filter, which generate a reconstructed signal that includes an excited signal and, therefore, reads on "an emphasizing unit for performing an emphasis process;" a buffer that reads on "a detecting unit;" and a flag group that reads on "a counting unit for counting and outputting a number of successive error frames." The Examiner further states that although Mano fails to specifically disclose "a controlling unit for stopping said emphasis process" and the "emphasis unit to generate excited signal," that the concept of having these elements was well-known as taught by Chennakeshu and Salami.

It is respectfully submitted that the Examiner has improperly included Chennakeshu in the scope and content of the prior art because Chennakeshu relates to non-analogous art. It is also respectfully submitted that the Examiner has failed to present a prima facie case of obviousness because he has failed to show that the

References teach or suggest all the claim limitations, failed to provide a motivation to combine the References in the manner he suggested and because there is no reasonable expectation of success when the References are combined as he suggested.

Under the Graham inquiry, a determination of obviousness is based on the following inquiries: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. MPEP § 2141; Graham v. John Deere Co., 382 U.S. 1, 17-18 (Fed. Cir. 1993). Under (1), the scope and content of the prior art includes only analogous prior art. In order for a reference to be considered analogous art, it must either be in the field of the applicant's endeavor or, if not, be reasonably related to the particular problem with which the inventor was concerned. MPEP § 2141.01(a); In re Oetiker, 997 F.2d 1443, 1446 (Fed. Cir. 1992).

"To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge of one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP § 706.02(j); In re Vaeck, 947 F.2d 488, USPQ2d 1438 (Fed. Cir. 1981).

With regard to the first prong of the test in Vaeck, the fact that the references can be combined or modified as suggested by the Examiner does not render the resulting combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 682, 680 (Fed. Cir. 1990). Furthermore, in order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art and cannot be based on the applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. In re Ruff, 256 F.2d 590 (C.C.P.A. 1958). With regard to the third prong of the test in Vaeck, "[a]ll the words in a claim must be considered in judging the patentability of that claim against the prior art." MPEP § 2143.03; In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Chennekeshu is Not Properly Included in the Prior Art Because it Relates to Non-Analogous Art:

Chennekeshu does not deal with the field of speech decoding nor does it relate to the particular problem of decreasing the reduction in sound quality due to successive frame errors experienced when producing reconstructed speech. Chennakeshu generally relates to digital cellular mobile radio and more particularly to the problems associated with delay spreads (Chennakeshu, column 1, lines 31-64) Chennakeshu teaches a digital cellular radio receiver that includes a decision feedback equalizer ("DFE") that addresses the problem of delay shift (Chennakeshu, columns 3-4, lines 53-68 and 1-12, respectively) In contrast, the Pending Application as claimed, relates generally to speech coding and decoding and more particularly to "lessening the reduction of the subjective sound quality even when frame errors occur in succession" (Pending Application, page 1, lines 24-26). More specifically, the Pending Application describes speech coding systems, such as CELP, which reconstruct a speech signal from coded speech signals in part by creating an excitation (or "excited") signal from an adaptive code vector and a fixed code vector. In these speech coding systems, the fixed code vector often includes an adaptive preprocessing filter that, when errors in the coded speech signals occur, can ultimately degrade the quality of the reconstructed speech. Persons of ordinary skill in the art of speech coding trying to solve the problem of quality degradation caused by an adaptive preprocessing filter would not look to a reference in the area of digital cellular radio deals with the problem of delay shift. It is therefore respectfully requested that the Chennakeshu reference be withdrawn from the cited prior art.

There is No Motivation to Combine the References as Suggested Because the References Themselves Do Not Suggest the Combination and Do Not Recognize the Equivalency of an Equalizer and the Emphasizing Unit:

It is respectfully submitted that modifying Mano by adding the pre-processing filter of Salami and the switch of Chennakeshu so that the error information of Mano controls the switch of Chennakeshu to selectively remove the pre-processing filter of

Salami from Mano is not suggested by any of the References. Mano relates to CELP-type speech decoders. In Mano, distortions due to transmission errors in reconstructed speech are reduced by controlling the various parameters of a speech decoder including the coefficients of a filter that filters the reconstructed speech signal (a "post-filter"). The post-filter in Mano is controlled as a function of whether error codes are detected in future, current or past frames (Mano, page 4. lines 15-23). Whether error codes are detected in future, current or past frames, is designated by error flags $S_0$, $S_1$ and $S_2$, respectively. (Mano, page 5, lines 9-12). When an error is detected in the current frame, the value of the various parameters and thus the current frame depends on whether there is an error detected in the past and/or future frames as indicated by the error flags. (Mano, page 6, lines 1-3). Salami also relates to CELP-type speech decoders. However, Salami attempts to improve the quality of reconstructed speech by reproducing the periodic or non-periodic nature of a speech signal (Salami, page 122, column 2, lines 22-25). Salami describes a filter P(z) that introduces periodicity to the adaptive-codebook contribution to the excited signal to avoid degradation of the reconstructed speech of high-pitched voices (Salami, page 122, column 2, lines 22-31). Salami also describes an error concealment procedure that reduces the degradation in the reconstructed speech caused by erased frames by classifying reconstructed frames as periodic or non-periodic (Salami, page 125, column 2, lines 28-46). As previously discussed, Chennakeshu relates to digital cellular radio.

There is nothing in any of the References that suggests the desirability of adding the pre-processing filter of Salami to the adaptive-codebook contribution to the excited signal in Mano so that the error states of Mano control the pre-processing filter. In particular, there is nothing in the References that suggest the problem addressed in the Pending Application. The Pending Application attempts to address the degradation of reconstructed speech due to the amplification of errors by an emphasis filter coupled to a fixed codevector decoder and recognizes that the degradation will increase as the number of successive errors increases (Pending Application, page 1, lines 18-20). These problems, which would also arise from adding the pre-processing filter of Salami to Mano, are not recognized by the References. Therefore, there is no motivation to

use the switch of Chennakeshu to remove the pre-processing filter of Salami from the coder/decoder of Mano when the number of successive errors exceeds a certain value.

Furthermore, it is respectfully submitted that there is nothing in the prior art that recognizes the equivalency of the equalizer in Chennakeshu with the emphasizing unit claimed in Claim 9. The Examiner states that Chennakeshu includes an equalizer and that the equalizer has the same function as the "emphasizing unit" claimed in the Pending Application. As stated in In re Ruff, mere functional equivalence of components is not sufficient to support an obviousness rejection. Furthermore, there is nothing in the prior art that teaches or suggests that the equalizer in Chennakeshu and the emphasizing unit of the Pending Application are functionally equivalent. The equalizer in Chennakeshu is used to preserve a signal that has been distorted by Inter-Symbol Interference ("ISI," which results from delay spread caused by multipath propagation) (Chennakeshu, col. 1, lines 50-57) and is not used whenever the delay spread is below a given value (Chennakeshu, col. 4, lines 5-10). In contrast, the emphasis unit of the Pending Application treats the output of the fixed codevector detector with emphasis processing such as pitch emphasis processing or formant emphasis processing and is removed when errors in the coded signal exceed a predetermined number (for example, see Pending Application, page 2, lines 3-5 and page 3, lines 24-28). There is nothing in Chennakeshu that teaches that the equalizer performs the same function as the claimed emphasis unit.

Because there is no motivation to combine the references as suggested by the Examiner, it is respectfully requested that the rejection of Claims 9 and 15 be withdrawn.

There is No Expectation That the References as Combined Would Be Successful:

It is respectfully submitted that combining the References as suggested by the Examiner would not reduce the degradation in quality resulting from a pre-processing filter because the pre-processing filter of Salami depends on the state of the adaptive codebook and because the error states in Mano merely reflect whether there was and

error and not the number of errors. The pre-processing filter of Salami is always dependent of the state of the adaptive codebook as indicated by the equation:

$$P(z) = \frac{1}{1 - \beta z^{-T}}$$

where T is the integer part of the pitch lag for the current subframe and β is the adaptive-codebook gain (Salami, page 122, second column, lines 27-31). Therefore, any code vectors generated from the fixed codebook decoder (including filter P(z)) and the adaptive codebook are always associated with each other. As a consequence of the complementary relationship between the fixed and adaptive codevectors will actually cause the further degradation in the reconstructed speech.

Furthermore, if the pre-processing filter of Salami and the switch of Chennakeshu were implemented in the decoder of Mano so that the error flags of Mano controlled the switch of Chennakeshu, the degradation in the reconstructed speech would not be improved. The error flags of Mano indicate whether there was an error and not the number of successive errors. Therefore, using the error information of Mano would not control the switch of Chennakeshu so that the pre-processing filter of Salami would be removed when the number of successive errors reaches a certain value.

Because there is no expectation that the combination of the references as suggested by the Examiner would be successful, it is respectfully requested that the rejection of Claims 9 and 15 be withdrawn.

The References Do Not Teach or Suggest all the Limitations of the Claims:

It is respectfully submitted that the References do not teach or suggest stopping an emphasis process when the number of successive error frames exceeds a predetermined value or counting a number of successive error frames. Claim 9 includes the limitation of "a control unit for stopping said emphasis process performed in said emphasizing unit *when said number of successive error frames exceeds a predetermined value*" (emphasis added), and Claim 15 includes the limitation of "stopping said emphasis process in an emphasizing unit *when said number of successive error frames exceeds a predetermined value.*" (emphasis added). None of

the References (Mano, Chennakeshu and Salami) teach stopping the emphasis process when the number of error frames exceeds a predetermined value.

As previously discussed, Mano relates to CELP-type speech decoders. In Mano, distortions due to transmission errors in reconstructed speech are reduced by controlling the parameters of a decoder including the coefficients of a post-filter as a function of whether error codes are detected in past, current or future frames. (Mano, page 4. lines 15-23). Whether error codes are detected in future, current and past frames, is designated by error flags $S_0$, $S_1$ and $S_2$, respectively (Mano, page 5, lines 9-12). $S_1$, which indicates whether there is an error in the current frame, can equal 0 to M, where "M" is a predetermined value that represents the length of consecutive frames over which burst-type errors can be considered to exist (Mano, page 5, lines 22-32). $S_2$, which indicates whether there was an error in the past frame, equals the prior value of $S_1$ (Mano, page 5, lines 13-14). $S_0$, which indicates whether there is an error in the future frame, equals zero when $S_1$= 0 to M+1 and there is no current error detected and equals $S_1$+1 if there is a current error detected (Mano, page 5, lines 19-35 and FIG. 4). When there is an error in the current frame, the post-filter will depend on whether there is an error in the past and/or future frame as indicated by the error flags (Mano, page 4, lines 15-23). In Mano, post-filter depends on whether there is a past, current or future frame error and not on the number of successive errors. There is nothing in Mano that alters any filter or controls any error correction based on the number of successive error frames.

Chennakeshu relates to a decision feedback equalizer ("DFE") for a digital cellular mobile radio (Chennakeshu, column 1, lines 22-26). This DFE includes a demodulator coupled to a vocoder (Chennakeshu, FIG. 2), where the demodulator includes an equalizer (Chennakeshu, columns 5-6, lines 64-68 and 1-6, respectively). Chennakeshu teaches that this equalizer can be electrically removed from the demodulator using a switch in geographical areas where the delay spread is less than 14 microseconds (Chennakeshu, column 6, lines 3-10). There is nothing in Chennakeshu that teaches an emphasis process stop unit that stops an emphasis process when a number of successive error frames exceeds a predetermined value.

As previously discussed, Salami relates to CELP-type speech decoders. In addition to teaching a pre-filter P(z), as previously discussed, Salami also describes an error concealment procedure that reduces the degradation in the reconstructed speech created by a decoder caused by erased frames (Salami, page 125, column 1, lines 32-34). In this error concealment procedure, erased frames are reconstructed based on past information (Salami, page 125, column 1, lines 40-41). The excitation signal of the missing frame is replaced with one of similar characteristics with gradually decaying energy. (Salami, page 12, column 1, lines 40-45). If the last reconstructed frame was periodic, the current frame will also be periodic, and if the last reconstructed frame was not periodic, the current frame will also not be periodic (Salami, page 125, column 2, lines 27-31). There is nothing in Salami that counts the number of successive error frames (frame errors in the coded speech signal) or that alters P(z) as a function of the number of successive error frames. In fact, there is no instance in which P(z) is stopped or removed.

Furthermore, Claims 9 and 15 each also include a "counting unit for counting and outputting a number of successive error frames" or "counting and outputting a number of successive error frames" (Claims 9 and 15, respectively). It is respectfully submitted that contrary to the assertion set forth by the Examiner, the flag group ($S_2$, $S_1$, $S_0$) in Mano does not count successive frame errors. As previously discussed, the flag group in Mano, tracks whether errors have been detected in future, current and past frames. As shown in Mano in FIG. 4, the values for $S_2$, $S_1$ and $S_0$ do not always equal or event indicate the number of consecutive errors. In another example, $S_0$ with a value of M+1 indicates that there are no errors in the corresponding frame. Additionally, $S_2$, $S_1$ and $S_0$ can at most equal M+1 where M is the length of consecutive error frames over which burst-type errors can be considered to exist. Therefore, $S_2$, $S_1$ and $S_0$ do not necessarily reflect the number of consecutive errors and can indicate no more than M successive errors.

Because the References do not teach or suggest all the limitations of the Claims, it is respectfully requested that the rejection of Claims 9 and 15 be withdrawn.

**Response to the Rejection of Claims 10-14 and 16**:

The Examiner has rejected Claims 10-14 and 16 as being unpatentable over Mano, in view of Ota et al. (Japanese Pat. Application No.: H2-256308 and translation, hereinafter "Ota"), further in view of Salami. In particular, the Examiner states that Mano teaches a speech decoding method based on linear prediction, such as CELP, which generates decoded signals from excited signals and, therefore, reads on "[a] speech decoder for generating an excited signal from a coded speech signal inputted on a frame basis and decoding said coded speech signal on a basis of said excited signal." The Examiner further states that Mano also teaches "an emphasizing unit for performing an emphasis process," a buffer that reads on "a detecting unit," and a flag group that reads on "a counting unit for counting and outputting a number of successive error frames."

The Examiner states that although Mano fails to specifically disclose "a controlling unit for stopping said emphasis process" and the "emphasis unit to generate excited signal," that the concept of having these elements was well-known as taught by Ota and Salami.

There is No Motivation to Combine the References as Suggested Because the References Themselves Do Not Suggest the Combination

It is respectfully submitted that modifying Mano by adding the controllable adaptive filter and control means for generating the excited signal and controlling the amount of emphasis of the filter based on frame error condition as taught by Ota and Salami. As previously discussed, Mano reduces distortions in the reconstructed speech by controlling the coefficients of a post-filter as a function of whether error codes are detected in the past, future or current frames. In contrast, as previously discussed, Salami teaches avoiding the degradation of a reconstructed speech signal by using a pre-filter that introduces periodicity to the adaptive-codebook contribution to the excited signal and an error concealment procedure that classifies reconstructed frames as periodic or non-periodic. Like Mano, Ota teaches a post-filter (Ota, page 2, line 16). However, in Ota, the post-filter performs error correction on the excited signal as a function of whether there are errors detected in auxiliary information and an estimated channel error rate (Ota, page 6, lines 22-25). The auxiliary information in Ota includes

redundancy bits that are encoded along with the speech signal and the estimated channel error rate is estimated from the reception level and corresponds to the error rate in the primary information (the speech signal) (Ota, page 5, lines 7-27).

There is nothing in any of the References that suggests the desirability of adding the pre-processing filter of Salami to the adaptive-codebook contribution to the excited signal in Mano so that the error states of Mano control the pre-processing filter. As previously discussed in connection with the rejection of Claims 9 and 15, there is nothing in the References that suggest the problem addressed by the Pending Application, which would indicate that by adding the pre-processing filter of Salami to Mano, the errors in the coded speech would thereby be amplified as a function of the number of successive errors. Therefore, there is no motivation to control the filter of Salami with the error detection and channel monitoring portions of Ota.

There is No Expectation That the References as Combined Would Be Successful:

It is respectfully submitted that the References as combined by the Examiner would not be successful in reducing the quality degradation of the reconstructed speech. As previously discussed in connection with the rejection of Claims 9 and 15, no reduction in degradation would be achieved by the suggested combination because the error information of Mano does not reflect the number of successive errors, therefore the filter of Salami could not be controlled as a function of the number of successive errors. In addition, the complimentary relationship between the adaptive-codebook gain and the fixed codebook pre-filter would actually cause further quality degradation in the reconstructed speech when the frame errors occurred frequently. Because there is no expectation that the combination of references as suggested by the Examiner would be successful, it is respectfully requested that the rejection of Claims 10-14 and 16 be withdrawn.

The References Do Not Teach or Suggest All the Limitations of the Claims:

It is respectfully submitted that the References do not teach or suggest controlling at least one degree of emphasis when the number of successive error

frames exceeds a predetermined value or counting a number of successive frame errors. Claims 10-14 includes the limitation of "a control unit for controlling at least one degree of emphasis performed in said emphasizing unit *on a basis of said number of successive error frames exceeds a predetermined value*" (emphasis added), and Claim 16 includes the limitation of "controlling a degree of emphasis performed in an emphasizing unit *on a basis of said number of successive error frames exceeds a predetermined value*." (emphasis added). None of the References (Mano, Ota and Salami) teach controlling the degree of emphasis in the emphasis process when the number of error frames exceeds a predetermined value.

As previously discussed, Mano includes error flags that indicate whether the past, current or future frames have an error and do not accurately reflect the actual number of errors. Salami, as previously discussed, determines whether reconstructed frames are periodic. Ota, controls a post-filter based on whether there are errors in auxiliary information and on the estimated channel error rate (Ota, page 6, lines 22-25). Ota is not concerned with the number of successive error frames but with "the presence or absence of errors" (Ota, page 6, line 23). Therefore, none of the References even suggest controlling the degree of emphasis when the number of error frames exceeds a certain value.

Furthermore, Claims 10-14 and 16 each also include a "counting unit for counting and outputting a number of successive error frames" or "counting and outputting a number of successive error frames" (Claims 10-14 and 16, respectively). As stated previously, it is respectfully submitted that contrary to the assertion set forth by the Examiner, the flag group ($S_2$, $S_1$, $S_0$) in Mano does not count successive frame errors but tracks only whether errors have been detected in future, current and past frames.

Because the References do not teach or suggest all the limitations of the Claims, it is respectfully requested that the rejection of Claims 10-14 and 16 be withdrawn.

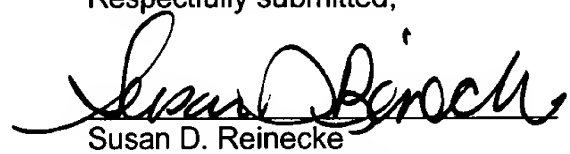
**Summary**:

In conclusion, and in view of the remarks set forth above, reconsideration and withdrawal the rejection of the Claims is respectfully requested. It is respectfully

submitted that the Pending Application, including Claims 9-16, is in condition for allowance. Favorable action therefore is respectfully requested.

If any additional information is required, the Examiner is invited to contact the undersigned at (312) 321-4000. The Commissioner is hereby authorized to charge any additional fees (or credit any overpayment) associated with the communication to our **Deposit Account No. 23-1925**. If a fee is required for an extension of time under 37 CFR 1.136 not accounted for above, such extension is requested and such fee should also be charged to our Deposit Account.

Respectfully submitted,



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